Network Models in Economics and Finance – A Book Review

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Abstract **– Through this work the book "Network Models in Economics and Finance", 978-3-319-09683-4, vol. 100 in Springer Series "Springer Optimization and Its Applications" is reviewed. Valery A. Kalyagin, Panos M. Pardalos, Themistocles M. Rassias, Editors of this book describe briefly its content as a book that:**
-Contains new tools for financial data mining and discusses the uncertainty of the network market analysis,
-Provides network analysis to the financial crises,
-Includes methods of network analysis applied to corporate governance and investment tools.
The keywords and the related subjects presented below, also supplied by the Editors, give a complete idea about the broad range of the subjects dealt with in this book and also on the analytical tools used and described. The whole book is written in a very readable English, but also with style. The subjects are presented in a very clear way, with no loss of scientific rigor. So this is an important book not only for the evident enormous importance of the theme but also because its accessibility to the readers allows a great dissemination of this knowledge. It deserves also to be emphasized that a substantial part of this book is devoted to the Financial Markets so determinant to the World Economy for good and for evil. In short: a book indispensable reading for senior and beginner researchers and professionals in economics, financial management and network analysis.

Keywords **–** Financial data mining, Market graph analysis, Market network analysis, Mathematics for economics and finance, Network modeling in economics, Network modeling in finance.

Related subjects **–** Applications, Complexity, Database Management & Information Retrieval, Financial Economics, Mathematics.

1. The review

This book is composed of fourteen chapters:

-Experimental design problems and Nash equilibrium solutions

-A Variational Approach to the Evolutionary Financial Equilibrium Problems with Memory Terms and Adaptive Constraints

-Robustness of sign correlation in market network analysis

-Two Classes of Games on Polyhedral Sets in Systems Economic Studies

-Densely Entangled Financial Systems

-Sigmoid Data Fitting by Least Squares Adjustment of Second and Third Divided Differences

-Financial Modeling under Multiple Criteria

-Agent-based Models of Stock Exchange: Analysis via Computational Simulation

-Network Centrality and Key Economic Indicators: A Case Study

-Network structures uncertainty for different markets

-Complexity Analysis and Systemic Risk in Finance: Some Methodological Issues

-A Dynamic Network Economic Model of a Service-Oriented Internet with Price and Quality Competition

-European Business Cycle Synchronization: A Complex Network Perspective

-A Novel Banking Supervision Method using the Minimum Dominating Set.

In general, the whole book is devoted to the use of network models to investigate the interconnections in modern economic systems, hopping that this will lead to a better understanding and explaining of some

economic phenomena, in particular in what concerns their financial issue.

A special attention is given to the Financial Markets namely to the banking system and the stock exchange. Of course this is imperative in nowadays times and, in accordance, the models presented are also supposed to help to analyze the financial crisis and the risk in finance.

Also remarkable is the presence of Game Theory in this book. It became indispensable in markets analysis and the authors that used it here made it in a very innovative way.

Notable also the explicit reference to Complex Network in the chapter "European Business Cycle Synchronization: A Complex Network Perspective", perceiving that business cycle synchronization, at a global level, is a complex network problem. In fact this idea of complex network problems is present, either explicitly or implicitly, along the whole book.

Of course an approach of this kind, that is, networks in complex problems, demands a broad spectrum of tools. Here, Mathematics, Statistics, Operations Research, Simulation, Data Mining, Game Theory, Networks, Complexity, Database Management & Information Retrieval, Finance and Economics are present. All these tools are used with dexterity and purpose by the several authors, who expose very clearly their applications, allowing to the readers even with some mathematical difficulties, their perfect understanding.

This book may be said to be complete in the sense that, not presenting of course the whole kind of possible analysis methodologies in this field, it gives a small and diverse set universal in the quantity of the problems approachable through them.

So "Network Models in Economics and Finance" is a very good handbook for researchers and professionals in this field.

2. Overall Review

A book dealing with a very important subject, scientifically rigorous and very well written, that is an indispensable reading for senior and beginner researchers and professionals in economics, financial management and network analysis.

Reference

[1] Valery A. Kalyagin, Panos M. Pardalos, Themistocles M. Rassias (Eds.). Network Models in Economics and Finance. Series: Springer Optimization and its Applications, XV, 290 p., 70 illus., 27 illus. in color, 2014. ISBN: 978-3-319-09683-4. DOI: 10. 1007/978-3-319-09683-4.